Video compression proposal

Team member:
資碩計一：111753225 陳暐中
Title: 4K Video Coding Efficiency in UAV Systems

Abstract:
This paper presents a comprehensive study that compares the efficiency of two popular video encoders in a First-person view (FPV) drone piloting system. To conduct the study, the authors personally filmed test sequences using a drone equipped with a 4K camera, capturing scenes with diverse spatiotemporal characteristics. The sequences were carefully categorized into four classes based on their complexity. Each sequence was then encoded using various combinations of encoding parameters.

To evaluate the performance of the video encoders, the authors calculated four objective video quality metrics for each set of encoding parameters, resulting in a dataset of over 1000 samples. The metrics provided a quantitative measure of the encoded video quality and efficiency. Through their analysis, the authors identified key factors influencing video encoding efficiency, particularly the correlation between the target bitrate and the Quantization Parameter (QP). They observed instances where the target bitrate significantly deviated from the actual bitrate due to improper QP restrictions.

The paper concludes by presenting vivid results for each class and an overall conclusion, offering valuable insights for drone pilots in choosing the most efficient video encoder based on their specific needs. Moreover, the findings contribute to the development of more tailored and optimized video encoders for UAV systems, enhancing the overall video streaming and transmission capabilities in FPV drone applications.